

ANNULAR ECLIPSE OF THE SUN, 1858, MARCH 14-15.

THE following suggestions for observation of the eclipse are not offered as by any means complete, but as presenting grounds for consideration, which may tend to direct observers in deciding on the employment of the means which they may possess.

I. *Observations not requiring Instruments.*

1. As the eclipse advances, it is desirable to obtain some notion or measure of the degree of darkness.
2. At what distance from the eye can a book or paper, exhibiting type of different sizes, be read?
3. Hold up a lighted candle nearly between the sun and your eye. At how many sun-breadths' distance from the sun can the flame be seen?
4. If you are in an elevated position, remark the changes of colour and appearance of the surrounding objects in the landscape.
5. If you see the spots of light formed by the intersecting shadows of the boughs of trees, remark whether they exhibit the lune-form of the sun.
6. When the annulus is formed, you will probably observe it with a darkened glass; but you are particularly requested to devote one instant (as early as possible) to the verification of this point, viz.: When the annular sun is viewed with the naked eye, does it appear an annulus or a fully illuminated disk?

II. *Optical, Astronomical, and Solar-physical Observations, requiring the use of Instruments.*

7. As the eclipse advances, estimate (on the image seen in the telescope) the comparative intensity of the sun's light near the centre of his disk and near his limb.
8. For the more critical observations, it is desirable that the power of your telescope should be so low as to give you an easy view of the whole breadth of the sun.
9. Remark irregularities on the moon's limb.
10. As the cusps become very sharp, remark whether they are irregular. For this, and for all the observations near the annular phase, it is necessary that you be provided either with a graduated prismatic shade, or with a succession of shades of different intensity, and that you instantly select the shade which is most agreeable to your eye.
11. Remark whether the sun's light extends beyond the inter-

section of the limbs of sun and moon, so as to make the moon's limb visible beyond that intersection. For this purpose the bright parts of the sun must be put out of the field of view, and the shade must be withdrawn.

12. As the annularity approaches and is formed, remark whether Baily's beads and strings are formed; whether first formed at points corresponding to large inequalities of the moon's limb; whether they surround the moon; how they form and break. Only an instant can be given to this observation. It is of the utmost importance to be assured that your vision at the instants immediately preceding, especially of the moon's inequalities, is very distinct.

13. Remark, as one of the most important observations of the eclipse, whether any red flames are seen on the sun's limb. For this purpose you must withdraw the shade, if you are on the annular track, the instant after formation of the annulus; if you are not on the annular track, as soon as the eye can bear the sun. On the annular track the whole line must be rapidly scrutinized; and when the ring breaks, the still-illuminated part must be put out of the field, and the moon's dark limb must be surveyed. At places not on the annular track, this plan (namely, to exclude the illuminated portion of the disk from the field, and to survey the moon's dark limb) must be followed throughout. It seems not improbable that the best chance of seeing red flames will be obtained at places not on the annular track.

14. At the breaking up of the annulus, look for Baily's beads as before.

15. Do not attempt any record during or near the annularity. Endeavour to impress observations on your memory as well as you can. If you have an assistant seated at a table with a chronometer and writing-materials, you may give him signals for the register of time, but you must connect the phenomena with the time afterwards.

16. A good sextant-observer may obtain valuable observations for correction of the lunar tables, by measuring the intervals between the points of the bright cusps. The observations will require great nerve, and will be difficult, but where most difficult they will be most valuable.

17. It seems doubtful whether any valid photographic record can be made, on account of the extreme rapidity of the change of appearances. Thus, in the neighbourhood of London, the line of cusps will change from the vertical to the horizontal position in about three minutes of time.

18. If you have a doubly refracting prism, it will be desirable to make observations on the polarization of the light from the sun's limb. For this purpose, when the lune is narrow, place the prism so as to separate the two images transversely to the limb, and remark which image is brighter. Turn the prism 180° round the visual ray, and repeat the observation. Remark carefully the positions of the prism. The prism may be used with the naked eye

or with the telescope, according to the amount of its angular separation of images.

III. *Meteorological Observations.*

19. For change in intensity of solar radiation, observations with the actinometer or the black-bulb thermometer should be kept up during the eclipse. The latter are most trustworthy when the bulb is inclosed in an exhausted glass sphere.

20. The barometer should be repeatedly observed.

21. The thermometer should be frequently observed, and the general feelings of cold should be noted.

22. Observations of humidity are very important. They should be made by the use, either of Daniell's dew-point instrument, or of the wet-bulb thermometer.

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